What Is Claimed Is:

1. A method for making a palladium-containing particulate product involving processing of a flowing aerosol stream, the method comprising the steps of:

introducing said aerosol stream into a reactor when said aerosol stream is a first aerosol flow including first droplets suspended in a carrier gas, with said first droplets including a palladium-containing precursor material;

removing, in said reactor, liquid from said first droplets and forming particles including palladium from said palladium-containing precursor;

removing said aerosol stream, as a second aerosol flow including said particles, from said reactor;

said first aerosol flow characterized as including greater than about 0.5 liter per hour of said first droplets at a droplet loading of greater than about 0.083 milliliters of said first droplets per liter of said carrier gas, said first droplets having an average size and a size distribution such that said particles have a weight average size of from about 0.1 micron to about 4 microns with at least about 75 weight percent of said particles being smaller than about twice said average size.

2. The method of Claim 1, wherein:

said aerosol flow includes greater than about 2 liters per hour of said droplets.

3. The method of Claim 1, wherein:

said first aerosol flow includes greater than about 5 liters per hour of said first droplets.

4. The method of Claim 1, wherein:

said first aerosol flow includes greater than about 10 liters per hour of said first droplets.

5. The method of Claim 1, wherein:

said first aerosol flow includes greater than about 40 liters per hour of said first droplets.

6. The method of Claim 1, wherein:

said first aerosol flow has a droplet loading of greater than about 0.083 milliliters of said first droplets per liter of carrier gas.

7. The method of Claim 1, wherein:

said first aerosol flow has a droplet loading of greater than about 0.167 milliliters of said first droplets per liter of carrier gas.

8. The method of Claim 1, wherein:

said first aerosol flow has a droplet loading of greater than about 0.333 milliliters of said first droplets per liter of carrier gas.

9. The method of Claim 1, wherein:

said first aerosol flow has a droplet loading of greater than about 0.833 milliliters of said first droplets per liter of carrier gas.

10. The method of Claim 1, wherein:

said first aerosol flow includes said first droplets at a density of larger than about 5×10^6 of said first droplets per cubic centimeter of said first aerosol flow.

11. The method of Claim 1, wherein:

said first aerosol flow includes said first droplets at a density of larger than about 1×10^7 of said first droplets per cubic centimeter of said first aerosol flow.

12. The method of Claim 1, wherein:

said particles have a weight average size of smaller than about 3 microns.

13. The method of Claim 1, wherein:

said particles have a weight average size of smaller than about 1 micron.

14. The method of Claim 1, wherein:

said particles have a weight average size of from about 0.2 micron to about 0.8 micron.

15. The method of Claim 1, wherein:

said particles have a size distribution such that at least about 90 weight percent of said particles are smaller than about twice said average size.

16. The method of Claim 1, wherein:

said particles have a density, as measured by helium pycnometry, of greater than about 90% of theoretical density.

17. The method of Claim 1, wherein:

said particles are substantially spheroidal.

18. The method of Claim 1, wherein:

said first droplets have a size distribution such that at least about 80 weight percent of said first droplets are smaller than about 10 microns in size.

19. The method of Claim 1, wherein:

said first droplets have a weight average size of from about 1 micron to about 5 microns.

20. The method of Claim 19, wherein:

said first droplets have a size distribution such that no greater than about 25 weight percent of said first droplets are larger than about twice the weight average size of said first droplets.

21. The method of Claim 1, wherein:

the method further comprises, prior to said step of introducing said aerosol stream into said reactor, generating said aerosol stream, including ultrasonically energizing a liquid-containing flowable medium from which generated droplets are released and sweeping said generated droplets away from said flowable medium with said carrier gas, said generated droplets comprising at least a portion of said first droplets; and

during said sweeping of said generated droplets away from said flowable medium, said carrier gas being delivered from a plurality of gas delivery outlets of a gas delivery system, with said plurality of gas delivery outlets being positioned to deliver different portions of said carrier gas to sweep away generated droplets released from different portions of said

liquid-containing medium, thereby distributing said carrier gas to promote effective sweeping away of said generated droplets from said different portions of said liquid-containing medium.

22. The method of Claim 1, wherein:

the method further comprises, prior to said step of introducing said aerosol stream into said reactor, concentrating said aerosol stream, including removing carrier gas from said aerosol such that, following the step of concentrating, said aerosol stream has a higher loading of droplets per unit volume of carrier gas than prior to the step of concentrating.

23. The method of Claim 22, wherein:

during said step of concentrating, droplet loading in said aerosol stream per unit volume of said carrier gas is increased by a factor of greater than about 2.

24. The method of Claim 22, wherein:

during said step of concentrating, droplet loading in said aerosol stream per unit volume of said carrier gas is increased by a factor of greater than about 5.

25. The method of Claim 1, wherein:

the method further comprises, prior to said step of introducing said aerosol stream into said reactor, subjecting said aerosol stream to classifying by size, including removing from said aerosol stream a first portion of droplets, including larger-size droplets, and retaining in said aerosol stream a second portion of droplets, including smaller-size droplets.

26. The method of Claim 25, wherein:

the cut point of classification between said first portion of droplets and said second portion of droplets is smaller than about 10 microns.

27. The method of Claim 25, wherein:

the cut point of classification between said first portion of droplets and said second portion of droplets is smaller than about 5 microns.

28. The method of Claim 25, wherein:

said first portion of droplets comprises no greater than about 20 weight percent of the total of said first portion of droplets and said second portion of droplets.

29. The method of Claim 1, wherein:

said reactor comprises a furnace at elevated temperature, and, in said reactor, said liquid is removed from said first droplets of said first aerosol flow by evaporation of said liquid.

30. The method of Claim 29, wherein:

residence time of said aerosol stream in a heated zone of said reactor is shorter than about 4 seconds.

31. The method of Claim 30, wherein:

said residence time is shorter than about 2 seconds.

32. The method of Claim 30, wherein:

said residence time is shorter than about 1 second.

33. The method of Claim 29, wherein:

said aerosol stream, in said reactor, attains a maximum average stream temperature of from about 900°C to about 1300°C.

34. The method of Claim 29, wherein:

said aerosol stream, in said reactor, attains a maximum average stream temperature of from about 950°C to about 1200°C.

35. The method of Claim 29, wherein:

said aerosol stream, in said reactor, attains a maximum average stream temperature of from about 950°C to about 1100°C.

36. The method of Claim 1, wherein:

the method further comprises, after said step of removing said aerosol stream from said reactor, cooling said particles, including flowing said aerosol stream through a cooling conduit while introducing into said cooling conduit a cooling gas that mixes with and cools said particles.

37. The method of Claim 36, wherein:

said cooling gas is introduced into said cooling conduit in a manner such that a buffer of said cooling gas forms adjacent a wall of said cooling conduit between said wall and said

particles, thereby separating said particles from said wall to reduce thermophoretic losses of said particles to said wall.

38. The method of Claim 36, wherein:

said cooling conduit includes a perforated wall perforated with openings through which said cooling gas enters said cooling conduit.

39. The method of Claim 38, wherein:

said perforated wall of said conduit extends substantially about the entire circumference of said cooling conduit such that said cooling gas is introduced radially into said conduit through holes of said perforated wall around substantially the entire circumference of said cooling conduit.

40. The method of Claim 39, wherein:

said cooling gas has a radial velocity entering into said conduit that is larger than a thermophoretic velocity of said particles toward said perforated wall.

41. The method of Claim 1, wherein:

said particles include a first material phase comprising said palladium; and

the method further comprises, after said step of forming said particles, forming a second material phase on said particles, said second material phase being compositionally different from said first material phase, whereby multi-phase particles are prepared including both of said first material phase and said second material phase.

42. The method of Claim 41, wherein:

said second material phase is substantially free of palladium.

43. The method of Claim 41, wherein:

said second material phase comprises a coating substantially covering said particles.

44. The method of Claim 43, wherein:

said coating has an average thickness of thinner than about 100 nanometers.

45. The method of Claim 43, wherein:

said coating has an average thickness that is thinner than about 25 nanometers.

46. The method of Claim 41, wherein:

the step of forming said second material phase includes physical vapor deposition of said second material phase on said particles.

47. The method of Claim 46, wherein:

said physical vapor deposition includes deposition from a vapor phase comprising at least one of an organic material, silver, copper, gold and combinations thereof.

48. The method of Claim 41, wherein:

the step of forming said second material phase includes chemical vapor deposition of said second material phase on said particles.

49. The method of Claim 48, wherein:

said chemical vapor deposition includes reaction of at least one coating precursor selected from the group consisting of inorganic salts, metal organics, organometallics, and silanes.

50. The method of Claim 48, wherein:

said chemical vapor deposition includes reaction of at least one coating precursor selected from the group consisting of silanes, metal formates, metal acetates, metal oxalates, metal carboxylates, metal alkyls, metal aryls, metal alkoxides, metal ketonates, metal amides, metal hydrides, metal halides, metal nitrates, and combinations thereof.

51. The method of Claim 41, wherein:

said second material phase comprises at least one of silica, alumina, titania, zirconia, yttria, silver, copper, gold, platinum, molybdenum, tungsten, an oxide of copper, an oxide of bismuth, and an oxide of tin.

52. The method of Claim 41, wherein:

said second material comprises at least one of a silicate, a titanate, a zirconate, an aluminate, a borate, a niobate, and a tantalate.

53. The method of Claim 52, wherein:

said second material phase comprises a titanate of at least one of barium, neodymium, calcium, magnesium and lead.

54. The method of Claim 1, wherein:

said palladium-containing precursor is a first precursor and said aerosol stream also includes a second precursor containing a second component that is other than palladium; and

said particles are multi-phase particles comprising a first material phase including palladium from said first precursor and a second material phase including said second component from said second precursor.

55. The method of Claim 54, wherein:

said second material phase comprises an oxide material.

56. The method of Claim 54, wherein:

said second material phase comprises a ceramic material.

57. The method of Claim 54, wherein:

said second material phase comprises at least one of silica, alumina, titania, zirconia, yttria, silver, copper, gold, platinum, molybdenum, tungsten, an oxide of copper, an oxide of bismuth, and an oxide of tin.

58. The method of Claim 54, wherein:

said second material phase includes at least one of a borate, a titanate, a zirconate, a silicate, an aluminate, a niobate and a tantalate.

59. The method of Claim 58, wherein:

said second material phase comprises at least one of barium titanate, neodymium titanate, calcium titanate, magnesium titanate, lead titanate and combinations thereof.

60. The method of Claim 54, wherein:

said first precursor is in solution in liquid of said first droplets; and

said second precursor comprises precursor particles held within said first droplets.

61. The method of Claim 60, wherein:

said precursor particles are smaller than about 0.5 micron.

62. The method of Claim 61, wherein:

said precursor particles are smaller than about 0.3 micron.

63. The method of Claim 61, wherein:

said precursor particles are smaller than about 0.1 micron.

64. The method of Claim 61, wherein:

said precursor particles are colloidal size.

65. The method of Claim 54, wherein:

both said first precursor and said second precursor particles are in solution in liquid of said first droplets.

66. The method of Claim 54, wherein:

said particles comprise said second material phase in an interior portion of said particles and said first material phase about the outer surface of said particles.

67. The method of Claim 54, wherein:

said particles comprise said second material phase as a coating about the surface of a core comprising said first material phase.

68. The method of Claim 1, wherein:

said particles comprise a metallic phase including greater than about 10 weight percent palladium and said particles have a resistance to oxidation of palladium in said particles such that when said particles are heated in an atmosphere of industrial grade air at atmospheric pressure to a temperature of 900°C at a heating rate of about 10°C per minute during thermogravimetric analysis, said particles demonstrate a maximum weight gain of no greater than about 40 percent relative to a

theoretical weight gain for complete oxidation of said palladium in said particles.

69. The method of Claim 68, wherein:

said maximum weight gain of said particles, during said thermogravimetric analysis, is no greater than about 30 percent relative to a theoretical weight gain for complete oxidation of said palladium in said particles.

70. The method of Claim 68, wherein:

said metallic phase is substantially polycrystalline with a mean crystallite size of larger than about 50 nanometers.

71. The method of Claim 68, wherein:

said metallic phase is substantially polycrystalline with a mean crystallite size of larger than about 100 nanometers.

72. The method of Claim 68, wherein:

said palladium-containing precursor is a first precursor and said aerosol includes a second precursor containing a second metal that is other than palladium; and

said metallic phase is an alloy including said second metal and greater than about 10 weight percent palladium.

73. The method of Claim 72, wherein:

said second metal is selected from the group consisting of silver, nickel, copper, platinum, molybdenum, tungsten, tantalum, aluminum, gold, indium, lead, tin, and bismuth.

74. The method of Claim 72, wherein:

said alloy comprises greater than about 30 weight percent palladium.

75. The method of Claim 72, wherein:

said alloy comprises greater than about 50 weight percent palladium.

76. The method of Claim 72, wherein:

said second metal is silver.

77. The method of Claim 76, wherein:

said metallic phase comprises from about 30 weight percent to about 70 weight percent palladium and from about 70 weight percent to about 30 weight percent silver.

78. The method of Claim 76, wherein:

said metallic phase comprises from about 10 weight percent to about 30 weight percent palladium and from about 90 weight percent silver to about 70 weight percent silver.

79. A method for making palladium-containing particles, the method comprising the steps of:

generating an aerosol including droplets suspended in a carrier gas, the generating comprising sweeping away with said carrier gas said droplets as said droplets are released from a reservoir of an ultrasonically energized flowable medium, said flowable medium comprising a liquid and a palladium-containing precursor.

removing at least a portion of said liquid from at least a portion of said droplets of said aerosol and forming particles including palladium from said palladium-containing precursor;

wherein, during said step of generating said aerosol, said carrier gas being delivered from a plurality of gas delivery outlets of a gas delivery system, with each of said plurality of gas delivery outlets being positioned to deliver a different portion of said carrier gas to sweep away a different portion of said droplets released from a different portion of said flowable medium, thereby distributing said carrier gas to promote effective sweeping away of said droplets from different portions of said flowable medium to form said aerosol.

80. The method of Claim 79, wherein:

a plurality of ultrasonic transducers underlie and are ultrasonically coupled with said flowable medium such that each of said ultrasonic transducers ultrasonically energizes a different portion of said flowable medium in said reservoir.

81. The method of Claim 80, wherein:

there is a protective coating on said ultrasonic transducers to prevent direct contact between said flowable medium and transducer material of said ultrasonic transducer.

82. The method of Claim 80, wherein:

said ultrasonic transducers are ultrasonically coupled with said flowable medium via an ultrasonically transmissive separator, disposed between said ultrasonic transducers and said

flowable medium, to prevent said flowable medium from contacting said ultrasonic transducers.

83. The method of Claim 82, wherein:

said ultrasonic transducers are ultrasonically coupled with said separator via an ultrasonically transmissive fluid, other than said flowable medium, located between said ultrasonic transducers and said ultrasonically transmissive separator.

84. The method of Claim 83, wherein:

said ultrasonically transmissive fluid flows between said ultrasonic transducers and said separator to cool said ultrasonic transducers during operation.

85. The method of Claim 80, wherein:

said plurality of ultrasonic transducers includes at least 9 transducers.

86. The method of Claim 80, wherein:

said plurality of transducers includes at least 25 transducers.

87. The method of Claim 80, wherein:

said plurality of transducers includes at least 40 transducers.

88. The method of Claim 80, wherein:

said plurality of transducers includes at least 100 transducers.

89. The method of Claim 80, wherein:

there being at least one of said gas outlets per each one of said transducers.

90. The method of Claim 80, wherein:

said plurality of transducers are mounted in an array on a single mounting plate.

91. The method of Claim 80, wherein:

during said generating step, greater than about 25 milliliters per hour of said droplets are swept away to form said aerosol per each of said ultrasonic transducers.

92. The method of Claim 80, wherein:

during said generating step, greater than about 50 milliliters per hour of said droplets as swept away to form said aerosol per each of said ultrasonic transducers.

93. The method of Claim 80, wherein:

during said generating step, greater than about 100 milliliters per hour of said droplets are swept away to form said aerosol per each of said ultrasonic transducers.

94. The method of Claim 80, wherein:

each of said gas delivery outlets is located above a different portion of said flowable medium.

95. The method of Claim 80, wherein:

said flowable medium includes atomization cones, each overlying one of said ultrasonic transducers, with troughs located between said atomization cones;

said gas delivery outlets being located above said troughs and adjacent to said atomization cones, such that carrier gas exiting said gas delivery outlets is directed toward said atomization cones to sweep away said droplets as said droplets are released from said atomization cones.

96. The method of Claim 95, wherein:

at least a portion of at least one of said gas outlets is vertically lower than the top of one of said atomization cones at which gas exiting said at least one of said gas outlets is directed, whereby at least a portion of said carrier gas exits from said at least one of said gas outlets vertically lower than said top of said one of said atomization cones.

97. The method of Claim 80, where:

exiting from each of said gas delivery outlets is a jet of said carrier gas, said jet being directed at an atomization cone of said flowable medium.

98. The method of Claim 97, wherein:

said jet of said carrier gas is substantially horizontally directed.

99. A palladium-containing particulate product having resistance to oxidation of palladium in the product, the particulate product comprising:

particles including a metallic phase comprising greater than about 10 weight percent palladium said particles having a weight average size of from about 0.1 micron to about 4 microns;

wherein, said metallic phase is substantially polycrystalline with a mean crystallite size of larger than about 50 nanometers and said particles are such that when said particles are heated in an atmosphere of industrial grade air at atmospheric pressure to a temperature of 900°C at a heating rate of about 10°C per minute during thermogravimetric analysis, said particles demonstrate a maximum weight gain of no greater than about 40 percent relative to a theoretical weight gain for complete oxidation of said palladium in said particles.

100. The particulate product of Claim 99, wherein:

said metallic phase includes greater than about 30 weight percent palladium.

101. The particulate product of Claim 99, wherein:

said metallic phase includes greater than about 50 weight percent palladium.

102. The particulate product of Claim 99, wherein:

said metallic phase comprises greater than about 70 weight percent palladium.

103. The particulate product of Claim 99, wherein:

said metallic phase is comprised of substantially entirely only palladium.

104. The particulate product of Claim 99, wherein:

said palladium in said metallic phase is in the form of an alloy with a second metal, said second metal selected from the group consisting of silver, nickel, copper, platinum, molybdenum, tungsten, tantalum, aluminum, gold, indium, lead, tin and bismuth.

105. The particulate product of Claim 104, wherein:

said second metal comprises silver.

106. The particulate product of Claim 105, wherein:

said alloy comprises from about 10 weight percent to about 70 weight percent palladium and from about 30 weight percent to about 90 weight percent silver.

107. The particulate product of Claim 105, wherein:

said alloy comprises from about 30 weight percent to about 70 weight percent palladium and from about 70 weight percent to about 30 weight percent silver.

108. The particulate product of Claim 99, wherein:

said particles have a weight average size of smaller than about 2 microns.

109. The particulate product of Claim 99, wherein:

said particles have a weight average size of smaller than about 1 micron.

110. The particulate product of Claim 99, wherein:

said particles have a weight average size of from about 0.2 micron to about 0.8 micron.

111. The particulate product of Claim 99, wherein:

said particles have a size distribution such that at least about 90 weight percent of said particles are smaller than about twice said weight average size.

112. The particulate product of Claim 99, wherein:

said particles have a density, as measured by helium pycnometry, that is greater than about 90% of theoretical density.

113. The particulate product of Claim 99, wherein:

said particles are substantially spheroidal in shape.

114. The particulate product of Claim 99, wherein:

during said thermogravimetric analysis, said particles demonstrate a weight gain of no greater than about 35 weight relative to said theoretical weight gain.

115. The particulate product of Claim 99, wherein:

during said thermogravimetric analysis, said particles demonstrate a weight gain of no greater than about 30 weight percent relative to said theoretical weight gain.

116. The particulate product of Claim 99, wherein:

during said thermogravimetric analysis, said particles demonstrate a weight gain of no greater than about 25 weight percent relative to said theoretical weight gain.

117. The particulate product of Claim 99, wherein:

said particles are substantially free of alkaline earth metals.

118. The particulate product of Claim 99, wherein:

said particles are comprised substantially entirely of said metallic phase.

119. A palladium-containing particulate product having resistance to oxidation of palladium in the product, the particulate product comprising:

particles including a metallic phase including greater than about 10 weight percent palladium and having a weight average size of from about 0.1 micron to about 4 microns, said particles being substantially free of alkaline earth metals;

wherein, said particles being such that when said particles are heated in an atmosphere of industrial grade air at atmospheric pressure to a temperature of 900°C at a heating rate of about 10°C per minute during thermogravimetric analysis, said particles demonstrate a maximum weight gain of no greater than about 40 percent relative to a theoretical weight gain for complete oxidation of palladium in said particles.

120. A multi-phase palladium-containing particulate product, the particulate product comprising:

particles having a weight average size of from about 0.1 micron to about 4 microns and a size distribution such that at least about 90 weight percent of said particles are smaller than twice said weight average size, said particles including a first material phase being metallic and comprising palladium and said particles also including a second material phase being substantially free of palladium, said particles having a density, as measured by helium pycnometry, of greater than about 80% of theoretical density.

121. The multi-phase particulate product of Claim 120, wherein:

said particles are substantially spheroidal in shape.

122. The multi-phase particulate product of Claim 120, wherein:

said first material phase comprises greater than about 50 weight percent of said particles.

123. The multi-phase particulate product of Claim 120, wherein:

said first material phase comprises greater than about 70 weight percent of said particles.

124. The multi-phase particulate product of Claim 120, wherein:

said first material phase comprises greater than about 90 weight percent of said particles.

125. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises less than about 30 weight percent of said particles.

126. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises less than about 10 weight percent of said particles.

127. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises greater than about 0.5 weight percent of said particles.

128. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises greater than about 1 weight percent of said particles.

129. The multi-phase particulate product of Claim 120, wherein:

said first material phase is electrically conductive and said second material phase is dielectric.

130. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises an oxide material.

131. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises a ceramic material.

132. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises at least one of silica, alumina, titania, zirconia, silver, copper, gold, platinum, molybdenum, tungsten, an oxide of copper, an oxide of bismuth and an oxide of tin.

133. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises a titanate.

134. The multi-phase particulate product of Claim 120, wherein:

said second material phase comprises a titanate of at least one of barium, neodymium, calcium, magnesium, strontium and lead.

135. The multi-phase particulate product of Claim 120, wherein:

said second material phase forms a coating around a core including said first material phase.

136. The multi-phase particulate product of Claim 135, wherein:

said coating substantially entirely surrounds said core.

137. The multi-phase particulate product of Claim 135, wherein:

said second material phase includes an organic material.

138. The multi-phase particulate product of Claim 120, wherein:

said second material phase is dispersed throughout a matrix of said first material phase.

139. The multi-phase particulate product of Claim 120, wherein:

said second material phase is a support on which said first material phase is supported.

140. The multi-phase particulate product of Claim 120, wherein:

said first material phase includes an alloy of palladium and a second metal selected from the group consisting of silver, nickel, copper, platinum, molybdenum, tungsten, tantalum, aluminum, gold, indium, lead, tin and bismuth.

141. The multi-phase particles of Claim 140, wherein:

said first material phase comprises from about 10 weight percent to about 70 weight percent palladium and from about 30 weight percent to about 90 weight percent silver.

142. The multi-phase particles of Claim 120, wherein:

said first material phase is substantially polycrystalline with a mean crystallite size of larger than about 50 nanometers.

143. A method for making a palladium-containing film, the method comprising the steps of:

applying a layer of paste to a substrate, said paste including particles dispersed in a carrier liquid, said particles including a metallic phase with greater than about 10 weight percent palladium, said particles having a weight average size of from about 0.1 micron to about 4 microns;

removing said carrier liquid from said layer of paste and forming on said substrate a film including palladium from said particles;

wherein, said metallic phase is substantially polycrystalline with a mean crystallite size of larger than about 50 nanometers and said particles have a resistance to oxidation of said palladium in said particles such that, when said particles are heated in an atmosphere of industrial grade air at atmospheric pressure to a temperature of 900°C at a heating rate of about 10°C per minute during thermogravimetric analysis, said particles demonstrate a maximum weight gain of no greater than about 40 percent relative to a theoretical weight gain for complete oxidation of said palladium in said particles.

144. A method for making a palladium-containing film, the method comprising the steps of:

applying a layer of paste to a substrate, said paste including palladium-containing particles dispersed in a carrier liquid, said particles having a weight average size of from about 0.1 micron to about 3 microns;

removing said carrier liquid from said layer of paste and forming on said substrate a film including palladium from said particles;

wherein, said particles having a size distribution such that greater than about 90 weight percent of said particles are smaller than about twice said weight average size and said particles including a first material phase comprising palladium and a second material phase being substantially free of palladium.

145. The method of Claim 144, wherein:

said first material phase comprises greater than about 50 weight percent of said particles.

146. The method of Claim 144, wherein:

said second material phase comprises less than about 30 weight percent of said particles.

147. The method of Claim 144, wherein:

said first material phase is electrically conductive and said second material phase is dielectric.

148. The method of Claim 144, wherein:

said substrate comprises a dielectric material for a capacitor and said second material phase of said particles also comprises said dielectric material.

149. The method of Claim 144, wherein:

said dielectric material is a titanate.

150. The method of Claim 144, wherein:

said second material phase comprises an oxide material.

151. The method of Claim 144, wherein:

said second material phase comprises a ceramic material.

152. The method of Claim 144, wherein:

said step of forming on said substrate a film including palladium from said particles comprises heating said particles, on said substrate, to a temperature of greater than about 300°C.

153. The method of Claim 144, wherein:

said method further comprises preparing a structure of stacked layers including a plurality of first layers including a dielectric material and second layers including said particles; and

heating said structure to a temperature of greater than about 300°C to form a microelectronic structure including a plurality of palladium-containing films, having palladium from said particles, and including a plurality of dielectric layers, with at least one of said dielectric layers being between two adjacent of said palladium-containing films.

154. An electronic device including a palladium-containing layer adjacent to a ceramic layer, the device comprising:

a first layer including palladium adjacent to a second layer including a ceramic material and being substantially in the absence of palladium, said first layer being electrically interconnected with said second layer when said electronic device is operational in a electrical circuit;

wherein, said first layer further comprising said ceramic material and said first layer having been prepared from particles including multi-phase particles having a weight average size of from about 0.1 micron to about 4 microns and with a size distribution such that greater than about 90 weight percent of said multi-phase particles are smaller than twice said weight average size, with said multi-phase particles having a first material phase including said palladium and a second material phase including said ceramic material.

155. The electronic device of Claim 154, wherein:

said ceramic material is a titanate.

156. The electronic device of Claim 154, wherein:

said ceramic material is a titanate of at least one of barium, neodymium, calcium, magnesium, strontium and lead.

157. The electronic device of Claim 154, wherein:

said electronic device comprises a capacitor including said first layer as an electrically conductive layer and said second layer as a corresponding dielectric layer.

158. The electronic device of Claim 154, wherein:

said first layer comprises less than about 10 weight percent of said ceramic material.

159. The electronic device of Claim 154, wherein:

said first layer comprises less than about 5 weight percent of said ceramic material.

160. The electronic device of Claim 154, wherein:

electrical contact between said first layer and said second layer being enhanced in comparison to electrical contact if said

first layer had been made with a mixture of particles consisting essentially of first particles substantially entirely of only said first material phase and second particles substantially entirely of only said second material phase.

161. A multi-layer capacitor including palladium-containing electrically conductive layers, the capacitor comprising

a structure having stacked layers including a plurality of dielectric layers each including a dielectric material, with each dielectric layer being adjacent to and electrically interconnected with at least one of a plurality of electrically conductive layers including palladium;

electrical contacts interconnected with said electrically conductive layers and said dielectric layers, said electrical contacts for connecting the capacitor in an electrical circuit when the capacitor is used;

said electrically conductive layers including said palladium and at least some of said dielectric material;

wherein, at least a portion of said palladium and said dielectric material in said electrically conductive layers being from multi-phase particles having a weight average size of from about 0.1 micron to about 4 microns and having a first material phase including said palladium and a second material phase including said dielectric material.

162. The electronic capacitor of Claim 161, wherein:

said first material phase comprises an electrically conductive alloy including palladium and a second metal.

163. The electronic capacitor of Claim 162, wherein:

said alloy comprises from about 10 weight percent to about 70 weight percent palladium and from about 30 weight percent to about 90 weight percent silver.

164. A particulate product having an alloy including palladium and silver and having resistance to oxidation of palladium in the product, the particulate product comprising:

particles including a metallic phase of an alloy including palladium and silver, said alloy having from about 10 weight percent to about 70 weight percent palladium and from about 10 weight percent to about 90 weight percent silver, said particles having a weight average size of from about 0.1 micron to about 3 microns;

said particles having a resistance to oxidation of palladium in said particles such that when said particles are heated in an atmosphere of industrial grade air at atmospheric pressure to a temperature of 900°C at a heating rate of 10°C per minute during thermogravimetric analysis, said particles demonstrate a maximum weight gain of no greater than about 40 percent relative to a theoretical weight gain from complete oxidation of said palladium in said particles.

165. The particulate product of Claim 164, wherein:

said particles are comprised substantially entirely of said metallic phase.

166. The particulate product of Claim 164, wherein:

said metallic phase is a first material phase and said particles also include a second material phase being substantially free of palladium and including a dielectric material.

167. The particulate product of Claim 164, wherein:

said alloy comprises from about 30 weight percent to about 70 weight percent palladium and from about 70 weight percent to about 30 weight percent silver.